GOLD NUGGET

Regulating Services – Atmospheric Composition And Climate Regulation Part 1

Nutrient cycles

Nutrient cycling is the transformation of nutrients contained in minerals from the original bedrock and in dead biomass into forms that are assimilable by plants and other organisms. In this way, nutrients can enter the cycles that will transfer them from the biosphere to soil, water and the atmosphere. The main nutrients are carbon, nitrogen and phosphorus. All soil organisms contribute to this major ecosystem function through a number of physical and chemical (digestion by a large number of enzymes) processes.

Carbon cycle

The transfer of carbon (C), in its many forms, between the atmosphere, living organisms (biosphere), oceans and soils (pedosphere) is described as the carbon cycle. In the atmosphere, carbon can be found in two main forms: carbon dioxide and methane. Carbon dioxide (CO_2) moves from the atmosphere to the terrestrial biosphere through photosynthesis. Photosynthesis is a process used by plants and other organisms to convert light energy and CO_2 into chemical energy, in the form of carbohydrates (sugars). Carbon leaves the terrestrial biosphere in several ways, including through the combustion of fossil fuels and metabolic respiration by plant and soil organisms. Human activities have modified the carbon cycle by directly adding carbon to the atmosphere.

Unbalanced budget

Currently, the global carbon budget is unbalanced, meaning that the release of CO_2 into the atmosphere is higher than fluxes into carbon sinks, such as peat and some tropical soils. This unbalance is caused by direct human activities.

It is estimated that ~ 215 Gt (gigatonne = 1012 kg) of carbon are removed from the atmosphere annually through photosynthesis (~ 123 Gt) and absorption by the oceans (~ 92 Gt). Total annual emissions amount to an estimated ~ 219 Gt via the auto- (~ 60 Gt) and heterotrophic (~ 60 Gt) respiration of terrestrial systems and releases from the oceans into the atmosphere (~ 90 Gt). In addition, anthropogenic activities, primarily through the use of fossil fuels, account for ~ 9 Gt C per year.

Soil biodiversity and the carbon cycle

Soils are of considerable importance for carbon cycling in terrestrial ecosystems, as a large proportion of the global terrestrial C pool (approximately 80 %) is stored underground. Furthermore, soils represent the main habitat for organic matter decomposition. Consequently, the flux of belowground C to the atmosphere through respiration and decomposition is rather substantial. Of the total soil respiration, heterotrophic soil biota account for around half, while the remainder is respired by plant roots and associated mycorrhizal fungi.

Soil species richness allows for myriad interactions, many of which alter aspects of C cycling. Soil microbes are responsible for the vast majority of respiration and decomposition in soils.

To be continued…

Soil Lovers say: ***Farming Regeneratively Has The Potential To Stem The Emissions***

Ref: **A Global Atlas of Soil Biodiversity p104**